

GUJARAT TECHNOLOGICAL UNIVERSITY
MBA – SEMESTER 02 – EXAMINATION – SUMMER 2018

Subject Code: 820007
Date: 28/05/2018
**Subject Name: RESEARCH METHODOLOGY AND OPERATIONS
 RESEARCH (RM&OR)**
Time: 10:30 AM To 01:30 PM
Total Marks: 70
Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Explain in detail “Research Process” with example **07**
- Q.1 (b)** What is Hypothesis? Explain Null and Alternative Hypothesis in detail. **07**
- Q.2 (a)** Use Graphical method to solve following Linear Programming Problem: **07**

$$\begin{aligned} \text{Max. } Z &= 2X_1 + 1.5X_2 \\ \text{STC } 36X_1 + 24X_2 &\leq 576 \\ X_1 + X_2 &\leq 20 \\ X_1, X_2 &\geq 0 \end{aligned}$$

- Q.2 (b)** What is sampling? Explain any three non-probability sampling techniques in detail. **07**

OR

- (b)** Explain “Survey technique” to collect primary data in detail. **07**
- Q.3 (a)** Explain in detail “Type I and Type II errors” **07**
- (b)** Write dual for the following: **07**

$$\text{Max } Z = 4X_1 + 5X_2$$

$$\begin{aligned} \text{STC } 3X_1 + X_2 &\leq 15 \\ X_1 + 2X_2 &\leq 10 \\ 5X_1 + 2X_2 &\leq 20 \\ X_1, X_2 &\geq 0 \end{aligned}$$

OR

- Q.3 (a)** Write and explain components of “Research Report Writing” **07**
- (b)** In the modification of plant layout of a factory, four machines M1, M2, M3 and M4 are to be installed. There are five places A, B, C, D and E available. Due to limited space, M2 cannot be placed at C and M3 cannot be placed at A. The cost of locating a machine at a place (in Rs. 100) is as follows. Find optimal assignment schedule. **07**

	A	B	C	D	E
M1	9	11	15	10	11
M2	12	9	--	10	9
M3	--	11	14	11	7
M4	14	8	12	7	8
M5	0	0	0	0	0

- Q.4 (a)** Find Initial Feasible Solution (Total cost of transportation) for the following transportation problem using North-west Corner rule. The following figures indicate Cost of transportation (in Rs. per unit). **07**

	W1	W2	W3	W4	Supply
F1	14	25	45	5	6
F2	65	25	35	55	8

FS	35	3	65	15	16
Demand	4	7	6	13	30

- (b) What is operations research? Explain the nature of operations research in detail. **07**

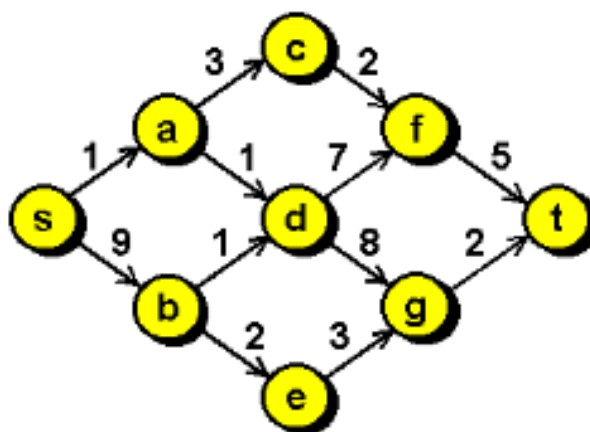
OR

- Q.4** (a) What is integer programming? Explain types of integer programming in detail. **07**

- (b) Producer of two types of products found that the cost of product A is Rs. 3 per unit and that of product B is Rs. 4 per unit. It is found that product A needs 3 man hours and product B needs 2 man hours. There are total 150 man hours available with company. Also product A requires 1 Kg. of Raw material per unit and product B requires 2 Kg. of Raw material per unit. Assuming total 400 Kg. of Raw material available with company, formulate LPP. **07**

- Q.5** (a) What is Monte Carlo simulation? Explain advantages and limitations of Monte Carlo simulations. **07**

- (b) Solve the following network and find out shortest path to reach from point "s" to point "t". **07**



OR

- Q.5** (a) What is qualitative and quantitative research design? Explain difference between them. **07**

- (b) A travelling salesman has to visit 5 cities. He wants to start from city A, visit each city once and return back to city A. The travelling cost in Rs. thousand, as given under: **07**

	A	B	C	D	E
A	-	2	5	7	1
B	6	-	3	8	2
C	8	7	-	4	7
D	12	4	6	-	5
E	1	3	2	8	-
